



Chapter 20. Environmental Justice

20.1 Overview

This chapter describes existing environmental justice and socioeconomic conditions in the areas surrounding ARC. It also summarizes the regulations applicable to environmental justice as well as relevant plans, policies, practices, and measures that address potential environmental justice impacts of operations and future development at ARC. Information and data presented in this chapter was obtained from the November 2009 NASA ARC ERD (NASA 2009), NADP EIS (Design, Community & Environment 2002), 2010 U.S. Census, and other sources.

20.2 Regulatory Background

20.2.1 Federal Regulations

20.2.1.1 *Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*

On February 11, 1994, the President of the United States issued an EO on federal actions to address environmental justice in minority populations and low-income populations (EO 12898). The order is designed to focus federal attention on the environmental and human health conditions in minority and low-income communities with the goal of achieving environmental justice. (*Environmental justice* is the principle that low-income and minority populations should not disproportionately bear the burden of environmental hazards.) The order directs federal agencies to:

- Develop strategies that promote non-discrimination in federal programs that substantially affect human health and the environment
- Provide minority communities and low-income communities access to public information on matters relating to their health or the environment
- Provide these communities an opportunity to participate in matters relating to their health or the environment

20.2.1.2 *National Environmental Policy Act*

NEPA and NASA's Environmental Justice Implementation Plans (EJIPs) (described in Section 20.5.4) are NASA's primary mechanisms for implementing the EO. When appropriate, EAs and EISs will be used to evaluate potential environmental effects (including human health, economic, and social) of ARC's activities on minority communities and low-income communities.

20.3 Regional Setting

Information regarding minority populations and low-income populations was gathered from the 16 census tracts located along Highway 101 within 5 kilometers (3.1 miles) of ARC. These tracts include single- and multi-family homes and mobile home parks within



the cities of Mountain View and Sunnyvale, as well as the Wescoat Village and former Orion Park military housing areas.

20.3.1 Minority Populations

For the purposes of this environmental justice analysis, minority populations in the vicinity of ARC were identified in accordance with the definitions provided by the CEQ in its publication *Environmental Justice; Guidance under the National Environmental Policy Act* (CEQ 1997). These definitions are as follows:

- **Minority**—Minority means a person who is: American Indian or Alaska Native; Asian; Native Hawaiian or other Pacific Islander; black or African American; Hispanic or Latino; some other race; or two or more races.
- **Minority population**—Minority populations are identified where either: (a) the minority population of the affected area exceeds 50% or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population. The CEQ guidance also states that a minority population exists “if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds.

For analysis purposes, a minority population is identified as follows:

- The minority population in the study area is equal to or greater than 50%; or
- The minority population in the study area is 10 or more percentage points higher than that of the comparable population (city or county, depending on location)

According to the 2010 census data, several census tracts in the study area contain minority populations exceeding 50 percent of the total population. This includes tracts that have proportionally higher percentages of Asian residents (5048.02, 5048.03, 5087.04, and 5091.02) and Hispanic/Latino residents (tracts 5046.02 and 5090) relative to the total population. In addition, a number of census tracts in the study area contain a single minority group that comprises less than 50% of the total population but is 10 or more percentage points higher than the group’s average in the comparative population. Tracts 5048.02, 5048.03, 5048.06, 5087.04, 5089, 5090, 5091.08, and 5093.04 in Sunnyvale have Hispanic/Latino populations ranging from 29.3 to 49.8%, which is higher than the city as a whole (18.9%). Tract 5108.01 in Palo Alto also contains a meaningfully greater percentage of Asian residents (44.0%) relative to the city (27.0%), and tract 5047, which is largely in unincorporated Santa Clara County, has a higher percentage of Black or African American residents (13.8%) than the County as a whole (2.4%).

In all, 14 of 16 census tracts in the study area either contain individual or combined minority groups that exceed 50 percent of the total population for the affected area or have a meaningfully greater percentage of minorities in comparison to the general population. These tracts are as follows: 5046.02, 5047, 5048.02, 5048.03, 5048.06, 5087.04, 5089, 5090, 5091.02, 5091.08, 5092.01, 5092.02, 5093.04, and 5108.01.



Table 20-1 provides a breakdown, by race and ethnicity, of county, city, and tract populations. Table 20-2 characterizes the study area minority population and the other comparative populations.



Table 20-1. Race and Ethnicity in the Environmental Justice Study Area

Geography	White ¹	Black or African American ¹	American Indian/ Alaska Native ¹	Asian ¹	Native Hawaiian/ Pacific Islander ¹	Other Race ¹	Two or More Races ¹	Hispanic or Latino ¹
Study Area								
Tract 5046.01	50.8% (50.8%)	3.3% (3.3%)	0.1% (0.1%)	13.2% (13.2%)	3.2% (3.2%)	0.4% (0.4%)	3.4% (3.4%)	25.6% (25.6%)
Tract 5046.02	17.6% (17.6%)	2.1% (2.1%)	0.4% (0.4%)	16.6% (16.6%)	0.2% (0.2%)	0.2% (0.2%)	1.9% (1.9%)	61.1% (61.1%)
Tract 5047	49.5% (49.5%)	13.8% (13.8%)	1.0% (1.0%)	6.5% (6.5%)	0.6% (0.6%)	0.1% (0.1%)	5.6% (5.6%)	22.9% (22.9%)
Tract 5048.02	26.4% (52.8%)	1.6% (1.7%)	0.5% (0.9%)	42.1% (52.2%)	0.5% (0.9%)	0.3% (0.4%)	3.5% (5.6%)	25.0% (34.3%)
Tract 5048.03	25.7% (28.1%)	2.3% (5.2%)	0.2% (0.4%)	51.0% (61.5%)	0.5% (1.6%)	0.3% (0.3%)	2.7% (2.8%)	17.3% (47.6%)
Tract 5048.05	54.2% (55.5%)	2.1% (2.4%)	0.2% (0.4%)	22.6% (22.9%)	0.7% (0.7%)	0.4% (0.5%)	3.1% (3.1%)	16.7% (16.8%)
Tract 5048.06	17.1% (19.1%)	2.1% (3.1%)	0.2% (0.3%)	38.9% (40.0%)	1.2% (1.8%)	0.2% (0.2%)	2.7% (3.0%)	36.9% (38.3%)
Tract 5087.04	29.1% (30.7%)	1.5% (1.7%)	0.4% (0.6%)	42.5% (59.4%)	0.4% (0.6%)	0.3% (0.4%)	2.8% (3.5%)	22.9% (30.8%)
Tract 5089	18.4% (23.2%)	1.8% (2.4%)	0.3% (0.6%)	33.2% (39.4%)	1.8% (3.0%)	0.2% (0.7%)	2.5% (3.3%)	41.7% (49.7%)
Tract 5090	25.5% (27.0%)	1.8% (2.0%)	0.3% (0.4%)	21.5% (26.7%)	0.7% (1.6%)	0.2% (0.3%)	2.7% (3.1%)	47.3% (53.1%)
Tract 5091.02	31.3% (39.0%)	2.4% (2.6%)	0.1% (0.1%)	51.6% (60.7%)	0.3% (0.5%)	0.3% (0.3%)	3.4% (4.1%)	10.5% (15.0%)
Tract 5091.08	37.4% (46.8%)	4.2% (6.1%)	0.2% (0.3%)	26.7% (31.9%)	0.8% (1.4%)	0.3% (0.7%)	3.9% (4.4%)	26.5% (36.7%)
Tract 5092.01	46.8% (62.7%)	2.7% (5.0%)	0.3% (0.5%)	26.3% (29.1%)	0.9% (2.0%)	0.3% (0.7%)	4.3% (5.4%)	18.4% (27.5%)
Tract 5092.02	46.4% (48.3%)	1.5% (2.5%)	0.2% (0.2%)	26.1% (35.3%)	0.4% (1.0%)	0.3% (0.6%)	3.1% (3.6%)	21.9% (23.7%)
Tract 5093.04	40.3% (46.6%)	2.9% (3.3%)	0.0% (0.0%)	23.6% (24.0%)	0.9% (1.5%)	0.8% (1.4%)	2.9% (3.4%)	28.7% (36.3%)
Tract 5108.01	52.8% (59.7%)	0.9% (1.0%)	0.0% (0.1%)	38.6% (44.0%)	0.1% (0.3%)	0.5% (0.8%)	3.3% (3.9%)	3.7% (4.7%)
Comparative Populations								
Santa Clara Co.	35.2%	2.4%	0.2%	31.7%	0.4%	0.2%	3.0%	26.9%
Mt View	46.0%	2.0%	0.2%	25.7%	0.5%	0.3%	3.6%	21.7%
Palo Alto	60.6%	1.8%	0.1%	27.0%	0.2%	0.4%	3.7%	6.2%
Sunnyvale	34.5%	1.8%	0.2%	40.7%	0.4%	0.3%	3.2%	18.9%
Notes:								
¹ For each census tract, the average percentage across all block groups is shown first, followed in parentheses by the highest block-level percentage. Grey shading indicates greater than 50 percent minority populations.								
Source: U.S. Census Bureau 2010a.								



Table 20-2. Minority Populations in the Environmental Justice Study Area

Geography	Total Population	Total Minority Population	Percent Minority ¹
Study Area			
Tract 5046.01	817	402	49.2% (49.2%)
Tract 5046.02	2144	1767	82.4% (82.4%)
Tract 5047	719	363	50.5% (50.5%)
Tract 5048.02	5242	3856	73.6% (85.9%)
Tract 5048.03	5756	4279	74.3% (80.9%)
Tract 5048.05	5294	2426	45.8% (46.6%)
Tract 5048.06	2930	2410	82.3% (83.3%)
Tract 5087.04	5227	3704	70.9% (72.6%)
Tract 5089	5273	4302	81.6% (84.8%)
Tract 5090	7407	5516	74.5% (76.9%)
Tract 5091.02	4798	3298	68.7% (74.3%)
Tract 5091.08	4281	2678	62.6% (69.8%)
Tract 5092.01	4603	2450	53.2% (60.9%)
Tract 5092.02	4480	2401	53.6% (58.3%)
Tract 5093.04	2871	1715	59.7% (68.6%)
Tract 5108.01	5290	2499	47.2% (52.7%)
Comparative Populations			
Santa Clara County	1781642	1154733	64.8%
Mountain view	74066	40014	54.0%
Palo Alto	64403	25351	39.4%
Sunnyvale	140081	91758	65.5%
Notes:			
¹ For each census tract, the average percentage across all block groups is shown first, followed in parentheses by the highest block-level percentage. Grey shading indicates greater than 50 percent minority populations. Source: U.S. Census Bureau 2010a.			

20.3.2 Low-Income Populations

With respect to identifying low-income populations, CEQ (1997) has provided the following definition:

- Low-income Population—Low-income populations in an affected area should be identified using the annual statistical poverty thresholds from the U.S. Bureau of Census's Current Population Reports, Series P-60, on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect.

For analysis purposes, a low-income population is identified as follows:

- The low-income population in the study area is equal to or greater than 50%; or
- The low-income population in the study area is 10 or more percentage points higher than that of the comparable population (city or county, depending on location).



The Census Bureau's Current Population Reports referred to in the above guidance present data on income and poverty at the national level. Subnational data on income and poverty, which was historically collected during the national decennial census, is now collected annually by the Census Bureau under its American Community Survey (ACS) program. As such, census tract data from the 2006–2010 ACS 5-Year Estimates (U.S. Census Bureau 2010b) were used to identify low-income populations in this analysis.

Poverty status, as defined by the U.S. Census, is determined by comparing a family or household's income with the poverty thresholds appropriate for its size. The Poverty Guidelines issued by the U.S. Department of Health and Human Services (HHS) are based on simplifications of the U.S. Census Bureau's detailed matrix of poverty thresholds and are updated annually using Consumer Price Index data. The guidelines vary by family/household size, with one set of figures for the 48 contiguous states, one set for Alaska, and one set for Hawaii.

For the year 2010 (HHS 2010), the national poverty thresholds for the 48 contiguous states were as follows:

- Family of 1: \$10,830
- Family of 2: \$14,570
- Family of 3: \$18,310
- Family of 4: \$22,050
- Family of 5: \$25,790
- Family of 6: \$29,530
- Family of 7: \$33,270
- Family of 8: \$37,010

Guidance from the EPA (1998) on incorporating environmental justice concerns in NEPA compliance analyses also suggests using other state and regional low-income poverty definitions as appropriate. Therefore, to account for the higher cost of living in the Bay Area, a higher threshold is considered appropriate for the identification of low-income populations within the study area. For the purpose of this analysis, low-income people are those with an annual household income that falls at or below a threshold that is 1.25 times the HHS 2010 Poverty Guidelines.

For households in the study area where the average household size is between 2 and 3 people, 1.25 times the poverty threshold for three people is ~\$23,000; for households with between 3 and 4 people, the poverty threshold adjusts to ~\$27,500. Based on the thresholds, households with incomes ranging from less than \$10,000 to \$29,999 (the range presented in the ACS 2010 5-year dataset) were tabulated to the block level for each census tract and for all comparative populations to obtain a low-income percentage.

None of the census tracts within the study area have low-income populations that exceed 50% of the total population; however, a number of tracts contain low income populations that are 10 or more percentage points higher than the low-income average in the comparative population. Tracts 5046.02, 5048.02, 5048.03, 5087.04, 5090, and 5091.02, all in Sunnyvale, have low-income populations ranging from 22.2 to 33.1%, which is higher than the city average (11.2%). As such, they would be considered low income.

Table 20-3 provides the total number and percent of low-income households within the study area and the other comparative populations.



Table 20-3. Low-Income Populations in the Environmental Justice Study Area

Geography	Households	Low-Income Households	Percent Low-Income Households ¹
Study Area			
Tract 5046.01	367	36	9.8% (9.8%)
Tract 5046.02	501	166	33.1% (33.1%)
Tract 5047	73	0	0% (0%)
Tract 5048.02	1746	273	15.6% (22.2%)
Tract 5048.03	2554	333	13.0% (25.9%)
Tract 5048.05	2315	282	12.2% (13.1%)
Tract 5048.06	1284	70	9.0% (13.5%)
Tract 5087.04	2288	315	13.8% (25.5%)
Tract 5089	1799	302	16.8% (18.9%)
Tract 5090	2572	459	17.8% (25.4%)
Tract 5091.02	2323	296	12.7% (14.8%)
Tract 5091.08	1657	130	7.8% (12.0%)
Tract 5092.01	2101	311	14.8% (30.0%)
Tract 5092.02	1695	203	12.0% (22.3%)
Tract 5093.04	1160	178	15.3% (19.1%)
Tract 5108.01	1693	49	2.9% (5.0%)
Comparative Populations			
Santa Clara County	596747	80536	13.5%
Mt View	31035	4325	13.9%
Palo Alto	25,486	2667	10.5%
Sunnyvale	53428	5965	11.2%
Notes:			
¹ For each census tract, the average percentage across all block groups is shown first, followed in parentheses by the highest block-level percentage. Grey shading indicates low-income populations that are 10 or more percentage points higher than that of the comparable population.			
Source: U.S. Census Bureau 2010b, 2010c.			

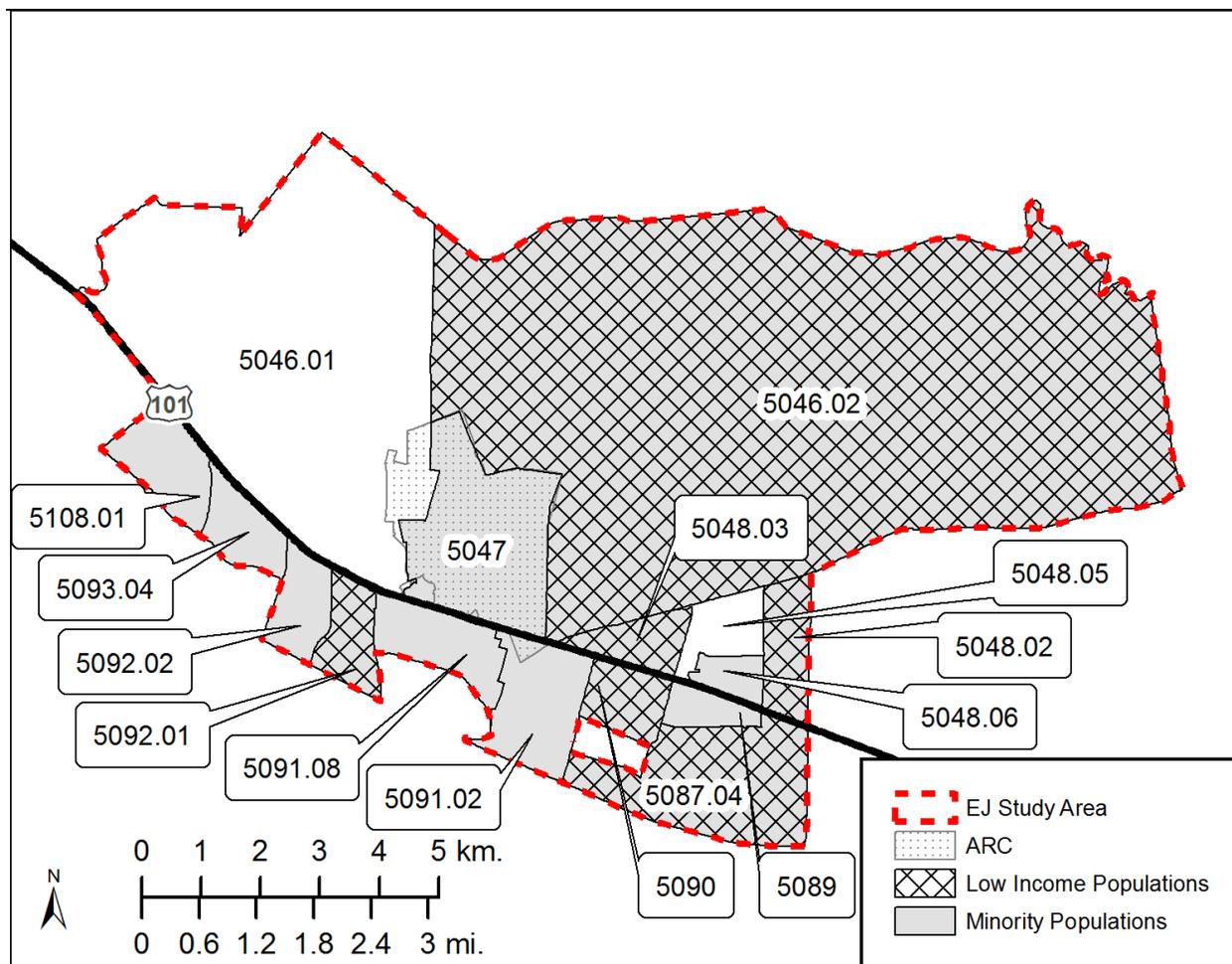


Figure 20-1. ARC Environmental Justice Study Area

(Sources: Tele Atlas North America, 2010 U.S. Census)

20.4 Existing Site Conditions

The EO does not describe precisely how wide an area around a federal facility to consider when identifying and evaluating the environmental effects of a facility's existing or proposed programs and activities. In order to ensure the inclusion of all residential communities in the EJIP, NASA has identified and evaluated the environmental effects of its activities. Environmental impacts from both normal operations and accidental releases at ARC have been assessed. Few of the normal operations at ARC create offsite impacts to the cities of Mountain View and Sunnyvale; however, these communities have in the past expressed concerns about noise, especially that generated by ARC's wind tunnel tests and MFA's aircraft flight operations.

Existing NASA operations were not found to significantly or disproportionately affect surrounding minority or low-income communities. Because aircraft operations have declined over the past few years as federal agency airfield users have left, new resident agency tenants and airfield users are being sought. Therefore, it is anticipated that noise



will continue to be a long-term concern, although noise from Ames does not disproportionately impact minority or low-income communities.

Hazardous materials releases were evaluated and measures were implemented to reduce or eliminate the risk and impacts of accidental toxic gas releases. The quantity of toxic gases in storage is limited to volumes that would not generate offsite effects. Furthermore, the use of toxic gases is restricted to properly designed cabinets equipped with continuous monitoring devices, alarms, and abatement equipment.

20.5 Environmental Requirements

NASA has identified the following environmental plans, policies, practices, and measures that address potential environmental justice impacts of operations and future development at ARC.

20.5.1 NASA Procedural Directive 8500.1, NASA Environmental Management

Per NPD 8500.1, it is NASA policy to: maintain compliance with all applicable federal, state, and local environmental requirements; to incorporate environmental risk reduction and sustainable practices to the extent practicable throughout NASA's programs, projects, and activities; and to consider environmental factors throughout the life cycle of programs, projects, and activities (as defined in NPD 7120.4, *NASA Engineering and Program/Project Management Policy*, and related documents), including planning, development, execution, and disposition activities. Examples of environmental factors include consideration of environmental impacts as required by the NEPA and NHPA; the proposed use of hazardous materials; the potential for waste generation; the need to acquire necessary permits, waivers, and authorizations; and the use of environmentally-preferable materials and processes wherever practicable.

20.5.2 Ames Procedural Requirements 8500.1, Ames Environmental Procedural Requirements

APR 8500.1 sets forth general procedural requirements to ensure compliance with applicable federal, state, and local environmental laws; regulations and EOs; and NASA policies and procedures. Organizational directors, division chiefs, branch chiefs, section heads, supervisors, managers, and CORs are responsible for planning, designing, constructing, managing, operating, and maintaining facilities in conformance with applicable regulatory directives, and should obtain environmental review from the Environmental Management Division early in project planning consistent with NASA's NEPA implementing procedures (NPR 8580.1 and EO 12114), NASA policies and procedures for programs and projects (NPR 7120), and NASA regulations related to environmental quality (14 CFR 1216). Program and project managers should coordinate with the Environmental Management Division in a timely manner to ensure that any new or modified programs, projects, and activities comply with regulatory requirements.



20.5.3 Ames Environmental Work Instructions

Ames's EWIs, which replace the previous Ames Environmental Handbook (APR 8800.3), set forth requirements to ensure that programs, projects, and activities at ARC comply with applicable federal, state, and local laws; regulations and EOs; and NASA policies and procedures. Each EWI lists relevant regulatory authorities and documents, assigns individual and organizational responsibilities within ARC, and identifies specific requirements applicable to the work being performed.

The following EWIs are relevant to potential environmental justice impacts of operations and future development at ARC.

- EWI 12, Public Involvement
- EWI 14, NEPA and Environmental Justice
- EWI 18, Environmental Requirements for Construction Projects (Under review)

20.5.4 NASA Ames Environmental Justice Implementation Plan

In 1995, NASA published an agency-wide Environmental Justice Strategy, pursuant to Section 2-2 of EO 12898. The purpose of this strategy is to ensure the integration of environmental justice into NASA's activities, programs, and policies through the development and implementation of location-specific EJIPs.

NASA ARC (as well as other NASA centers) developed its own EJIP and adapted its NEPA process to ensure that environmental justice concerns are addressed in each environmental assessment and environmental impact statement, as appropriate. According to the EO, evaluation of potential environmental justice impacts should be based on socioeconomic information to the extent possible, identifying minority populations and/or low-income populations that may be adversely affected. This information can then be used to determine whether any of the neighboring minority and low-income populations could be experiencing disproportionately high and adverse environmental effects as the result of ARC's programs, policies, or activities. If disproportionately high and adverse human health and environmental effects on minority communities or low-income communities are identified, the EJIP advocates that prudent measures be developed for eliminating or mitigating these effects, to the extent practicable.

20.5.5 NASA Ames Public Participation Program

Pursuant to Section 3-302 of EO 12898, subpart (b), NASA must inform the public when programs, policies, or activities regarding environmental justice concerns arise. At a minimum, NASA holds public meetings at times and in places that are convenient to the public to provide information and solicit comments from the community if proposed actions may impact local communities. NASA also develops public documents on environmental issues and publishes public meeting notices in local English language and non-English language newspapers. NASA also places all environmental documents in two local libraries so that they are easily accessible to the public. NASA maintains up-to-date



mailing lists of interested stakeholders to whom they send periodic updates to ensure full awareness of ARC's operations and potential impacts.

20.5.6 NASA Ames Supporting Policies and Practices

NASA has developed a number of policies and practices by which to minimize regional environmental justice impacts from ARC operations and increase stakeholders' involvement in activities. Some of these are:

- Pollution Prevention/Waste Minimization
- Hazardous Materials Management
- Hazardous Waste Management
- Industrial Wastewater Management
- Medical Waste Management
- Environmental Training
- Air Pollution Control
- Polychlorinated Biphenyls Management
- Storage Tank Management
- Hazardous Materials Closure Plans
- Storm Water Management
- SPCC and Facility Response Plan
- Emergency Planning and Community Right-To-Know
- Emergency Response
- Community Relations and Public Participation
- Environmental Justice
- NEPA
- Toxic Gas Management Procedures

20.5.7 NASA Ames Development Plan Final Programmatic Environmental Impact Statement

The NADP EIS identifies the following mitigation measure to address potential socioeconomic impacts from build out of NADP Mitigated Alternative 5.

20.5.7.1 Mitigation Measure SOCIO-1d

NASA would require at least 10 percent of the on-site housing to be affordable to low income households.